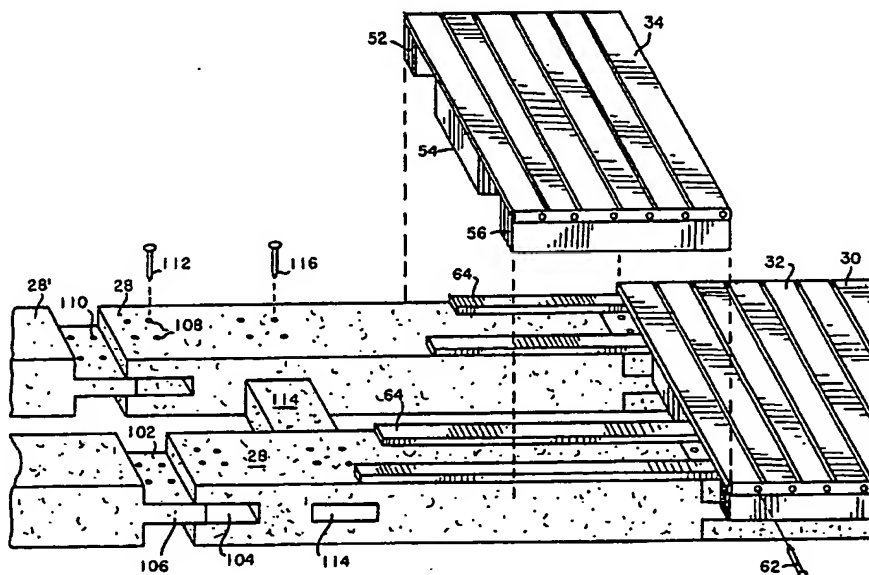


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(54) Title: FLOATING DOCK**(57) Abstract**

There is a need for inexpensive readily demountable docks for use on rivers, bays and ocean front properties. The present invention is a floating dock (10) comprising a plurality of elongated, co-parallel buoyant pontoons (26) arranged longitudinally of the dock (10). Deck structure (30) overlies the pontoons (26) and is in direct contact with the pontoons (26). The deck structure (30) is secured to the pontoons (26) by attachment pins (62). Structure for connecting the dock to anchoring structure (18) is also provided. Each pontoon (26) comprises a water-imperious foamed polymeric material having a density and volume preselected to buoyantly support the deck structure (30) and the design load imposed thereon above water level. Structure (84) is also provided for joining the floating dock (10) of the invention to another similar floating dock (10) or to a floating gangway (24).

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FLOATING DOCKField of the Invention

The invention relates to a floating dock, and in particular a floating dock which is light in weight, easily demountable, economical to fabricate and maintain, and modular in construction, so that it can be assembled in a wide variety of configurations.

Background of the Invention

There is a need for relatively inexpensive floating docks for use on rivers, bays and ocean front properties by cottage owners, marinas and other boat users. Prior art boat docks as presently employed are almost always entirely of the stationary type rigidly affixed and set in position using piles, caissons, timbers, concrete and other methods and materials planned to give lasting use. However, such permanent-type structures are extremely expensive to construct and maintain, and therefore the average private dock owner or small boat club cannot afford such facilities due to their high initial cost factor and high maintenance. Moreover, such permanent structures are fixed in place and cannot be removed for repair, maintenance, safe keeping or storage, and once installed, their configuration is fixed and cannot be modified without great expense. In addition, permanent structures, being of fixed design, present a continuing peril to the craft using the dock facilities in that the action of waves and tides causes boats to move relative to the dock, and damage could result if proper precautions are not taken.

It is thus desirable for docking facilities to be readily movable both from the view point of maintenance and repair, and to be easily demountable and movable from location. It is also desirable that the dock be capable of being assembled in a wide variety of configurations, which can be easily reconfigured to accommodate changes in use.

Docks which are light in weight, modular in construction and readily demountable by no more than two persons are also especially desirable in that they can be speedily dismantled and put in storage ashore in the event of an impending storm or the onset of winter.

At the same time, it is desirable to provide a floating dock which is light enough to be conveniently deployable at the beginning of the boating season.

Summary of the Invention

The present invention is a floating dock comprising a plurality of elongated, co-parallel buoyant pontoons means arranged longitudinally of the dock. Deck means overlie the pontoon means and are in direct contact with the pontoon means. The deck means are secured to the pontoon means by attachment means. Means for connecting the dock to anchoring means are also provided.

In a preferred embodiment of the invention, each pontoon means comprises a water-impervious foamed polymeric material having a density and volume preselected to buoyantly support the deck means and the design load imposed thereon above water level. Each pontoon means has a generally rectangular transverse cross-section. The deck means comprises floor means provided on the underside thereof with at least one box beam in engagement with the exterior walls of the pontoon means. The deck means are secured to the pontoons means by pins.

Means are also provided for joining the floating dock of the invention to another similar floating dock or to a floating gangway.

Description of the Drawings

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

Figure 1 is a plan view of a floating dock in accordance with the present invention.

Figure 2, which comprises Figures 2A, 2B and 2C, is a sectional view of the floating dock of Figure 1, taken along the line 2A-2B in Figure 1.

Figure 3 is a sectional view of the dock of Figure 1, taken along the line 3-3 in Figure 1.

Figure 4 is an exploded view of a portion of the floating dock in Figure 1, showing means for connecting the dock to anchoring means.

Figure 5 illustrates assembly of the various components of the floating dock according to the invention.

Description of the Invention

Referring now to the drawings, wherein like numerals indicate like elements, there is shown in Figure 1 a floating dock 10 in accordance with the present invention. The floating dock 10 is shown in place on a body of water 12 and comprises a longitudinal main walkway 14 and a plurality of finger units 16 which extend perpendicularly from main walkway 14. Except for their relative dimensions, the construction of main walkway and finger units 16 is identical. Floating dock 10 may be secured against motion parallel to the surface of the water by a plurality of piles 18 located at intervals along floating dock 10. Mooring piles 20 are also provided around floating dock 10 to facilitate the mooring of boats. Floating dock 10 is anchored to the shore 22 by a gangway 24. Gangway 24 may be any suitable gangway.

Referring now to Figure 2, both main walkway 14 and finger unit 16 comprise a pair of monolithic buoyant pontoons 26 of water-impervious polymeric material. A pre-

ferred, but by no means the only, suitable material for pontoons 26 is a 100% polyethylene closed-cell foam having a density of two pounds per cubic foot. Pontoons 26 are substantially rectangular in cross-section, and preferably have dimensions of approximately 20-3/4 inches wide by 16-1/2 inches high. The dimensions are chosen to yield a buoyant force on floating dock 10 sufficient to support the dock plus an anticipated vertical load thereon. Any suitable dimensions can be employed without departing from the invention.

Main walkway 14 and finger unit 16 are supported by pontoons 26 and 28, respectively, and comprise a plurality of individual deck units 30, 32, 34 and 36. Each deck unit 30, 32, 34 and 36 is substantially identical in structure, except for dimension. Each deck unit comprises a horizontal floor 38 constructed preferably of wooden deck planks typically measuring 2 inches by 6 inches in cross section, glued and screwed in position to the edges of frame members 40, 42, 44, 46, 48 and 50. The dimensions of horizontal floor 38 can be any suitable dimensions, typically 4 feet long by 8 feet wide.

Frame members 40 and 42, 44 and 46, and 48 and 50 make up box beams 52, 54 and 56, respectively. Box beams 52, 54 and 56 extend parallel to pontoons 26, and the spacing between box beams 52 and 54, and between box beams 54 and 56 is approximately 20-3/4 inches, which is pre-selected to furnish a snug fit with the sides of pontoons 26 when deck unit 30 is placed over pontoons 26.

Laterally-disposed box beams 52 and 56 are provided with bores 58 and 60 for receiving attachment means in the form of pins 62 for securing deck unit 30 to pontoons 26.

For added stability, box beams 52 and 56 may be replaced by the structure shown in Figure 2C. In Figure 2C, central box beam 54 is widened, allowing the pontoons 26 to be placed closer to the outboard edges of the floating dock. Instead of lateral box beams 52 and 56, the lateral sides of the deck unit are made up of a laminated plank 118

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comprising, for example, three 2x8 boards joined with glue and wood. In addition, two stiffening members 120 and 122 are placed under walkway 14 and over pontoons 26. As with the structure shown in Figure 2A, the deck unit is secured to pontoons 26 by dowel pins 62.

If desired, the horizontal floor 38 of deck unit 30 may be spaced from pontoons 26 by longitudinal spacing planks 64.

Box beams 52, 54 and 56 may be given lateral rigidity by cross-braces 66, 68 and 70 between respective pairs of frame members making up box beams 52, 54 and 56.

The full length of the external surfaces of main walkways 14 and finger units 16 are preferably provided with a rub rail 72 to protect both the floating dock and boats moored to it. Preferably, rub rail 72 measures 4 inches wide by 2 inches thick, and is made of six pound polyethylene, and is attached to main walkway 14 and finger unit 16 by counter-sunk screws fitted with nylon washers.

After assembly, all wood members are preferably double-sprayed with a wood treatment product to preserve the wood and at the same time restore the appearance of the wood to a visually-attractive lustre.

As best seen in Figure 3, lateral box beam 52 can also provide a convenient channel for plumbing 74 and electric cabling 76, which permits installation of faucets 78 and lighting fixtures 80 at convenient locations on the floating dock. Alternatively, plumbing and electrical lines can be run between spacing planks 64.

Referring to Figure 4, there is shown a means for connecting one floating dock unit to another, or for connecting a floating dock to a floating gangway to anchor the dock. One structure to be joined, denoted generally by numeral 82, is provided with a male beam 84 secured with screws 86 to an outwardly facing frame member 88. A mating female component 90 is provided on the other structure to be joined to structure 82. Female portion 90 is dimensioned to slide easily over male beam 84, so that the decks 92 and

94 of both structures are flush. Coupling is completed by driving wooden dowel pins 96 through aligned bores 98 and 100 on female and male coupling members respectively.

Preferred dimensions and materials for the floating dock of the present invention are described in co-pending application serial no. 857,117, referred to above and incorporated herein by reference.

Referring now to Figure 5, assembly of the various units of the floating dock according to the present invention is illustrated. pontoons of any desired length can be made by connecting shorter lengths in series. To facilitate connection of individual pontoon members, each pontoon can be provided with a tenon 102 at one end and a mortise 104 at the opposite end. Mortise 104 and tenon 102 are thus fitted together to make up a mortise and tenon joint 106. The mortise end of individual pontoon sections can be provided with openings 108 which align with openings 110 in the tenon 102 of a mating pontoon section 28'. A wooden pin 112 may be inserted through openings 108 and 110 to secure pontoon sections 28 and 28' together.

Also referring to Figure 5, a stiffening cross member 114 may be provided between co-parallel pontoons 28 to provide additional rigidity not provided by box beam 54. Preferably, cross member 114 is made of the same material as pontoons 28, and can be attached to co-parallel pontoons by a mortise and tenon joint secured by pins 116.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

CLAIMS

1. A floating dock, comprising a plurality of elongated, co-parallel buoyant pontoon means arranged longitudinally of the dock, deck means overlying the pontoon means and in direct contact with the pontoon means, attachment means for securing the deck means to the pontoon means, and means for connecting the dock to anchoring means.

2. A floating dock according to claim 1, wherein each pontoon means comprises a water-impervious foamed polymeric material having a density and volume preselected to buoyantly support the deck means and a design load imposed thereon above water level.

3. A floating dock according to claim 1, wherein each pontoon means has a generally rectangular transverse cross-section.

4. A floating dock according to claim 3, wherein the deck means comprises floor means provided on the underside thereof with at least one box beam in engagement with exterior walls of the pontoon means.

5. A floating dock according to claim 1, wherein the attachment means comprises pin means for securing the deck means and pontoon means together.

6. A floating dock according to claim 5, wherein the pin means comprises wooden dowels.

7. A floating dock according to claim 1, wherein the anchoring means comprises a floating gangway.

8. A floating dock according to claim 1, wherein the anchoring means comprises another floating dock.

9. A floating dock according to claim 1, wherein the means for connecting the dock to the anchoring means comprises a male connector means attached to one structure to be joined and a female connector means attached to the other structure to be joined for coupling engagement of the dock and anchoring means.

10. A floating dock according to claim 1, further comprising recessed channel means for receiving utility

lines for supplying utility stations at spaced locations along the dock.

11. A floating dock, comprising a plurality of elongated, co-parallel buoyant water-impervious foamed polymeric pontoons arranged longitudinally of the dock, each pontoon having a generally rectangular cross-section, deck means overlying the pontoon means and being provided on the underside thereof with at least one box beam in engagement with exterior walls of the pontoons, pins for securing the deck means and the pontoons together, and means for connecting the dock to anchoring means.

12. A floating dock according to claim 11, wherein pins comprise wooden dowels.

13. A floating dock according to claim 11, wherein the anchoring means comprises a floating gangway.

14. A floating dock according to claim 11, wherein the anchoring means comprises another floating dock.

15. A floating dock according to claim 11, wherein the means for connecting the dock to the anchoring means comprises a male connector means attached to one structure to be joined and a female connector means attached to the other structure to be joined for coupling engagement of the dock and anchoring means.

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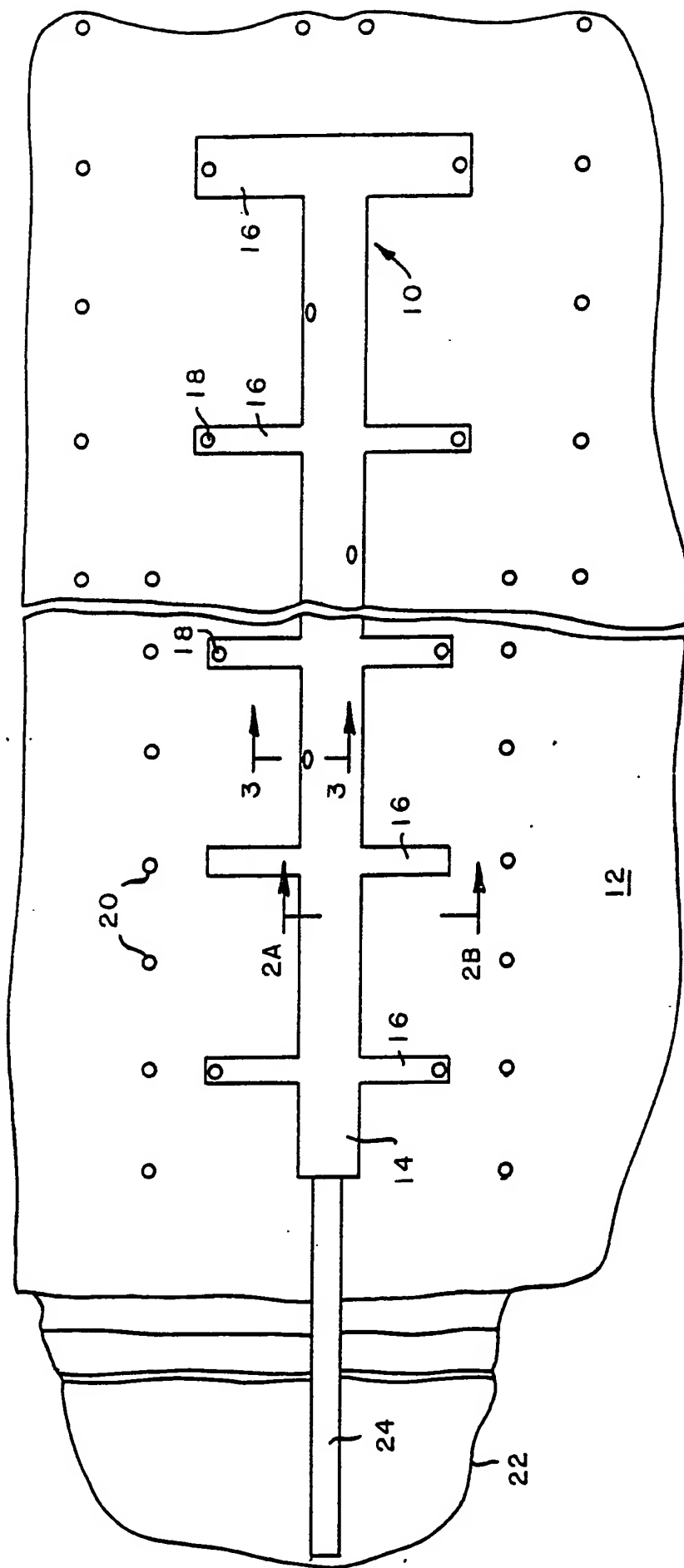


FIG. 1

FIG. 2A

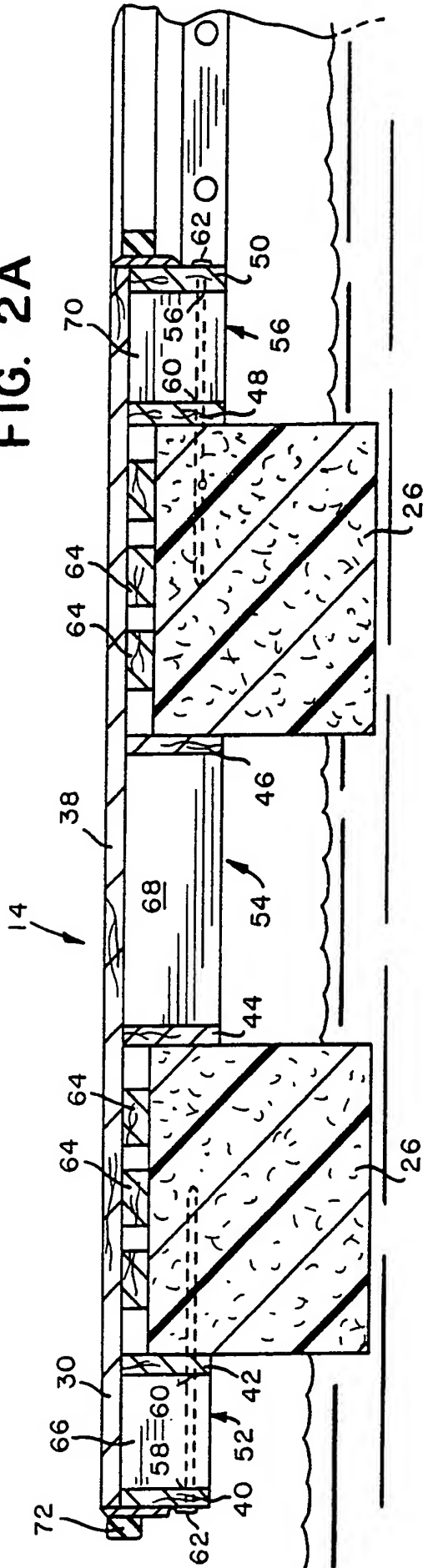
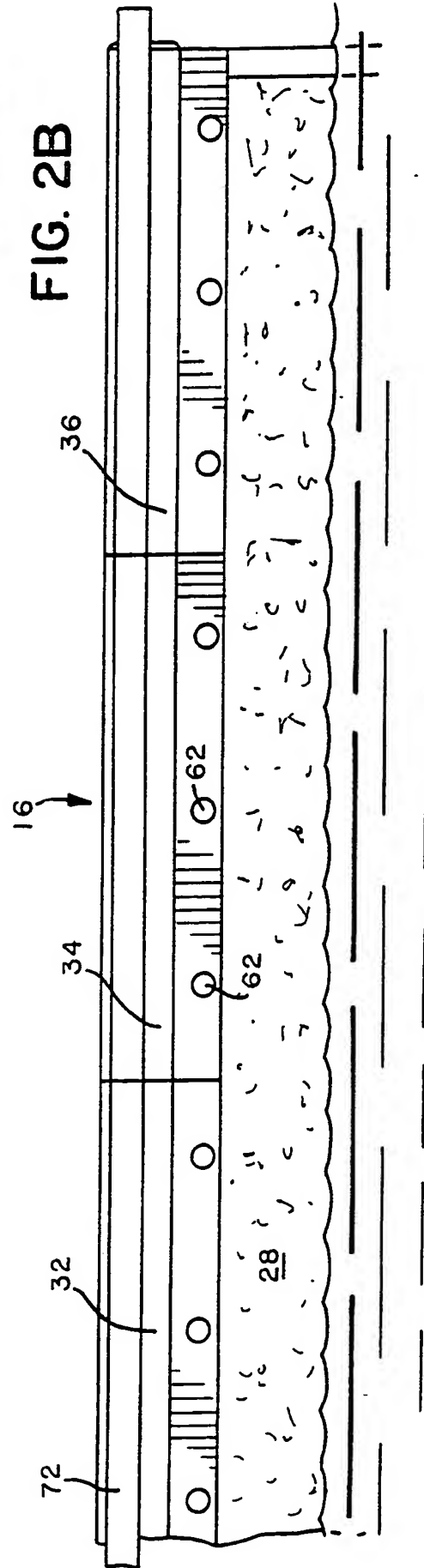


FIG. 2B



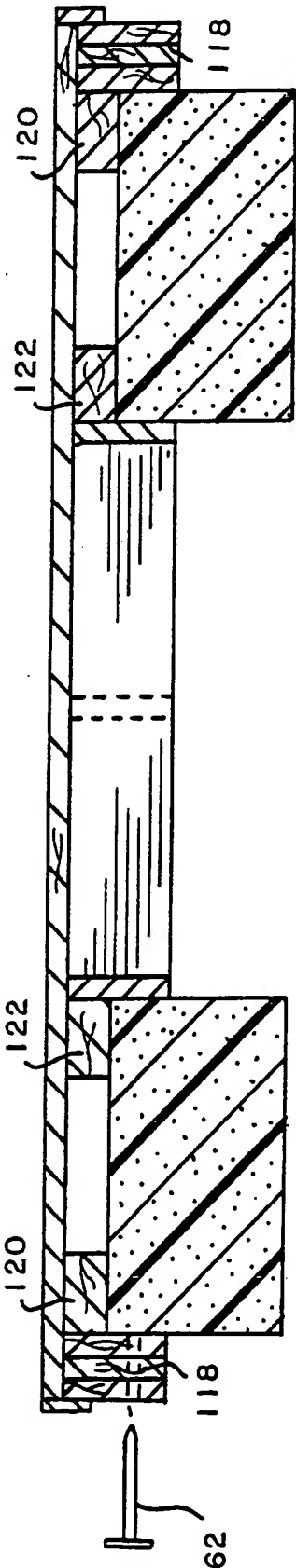
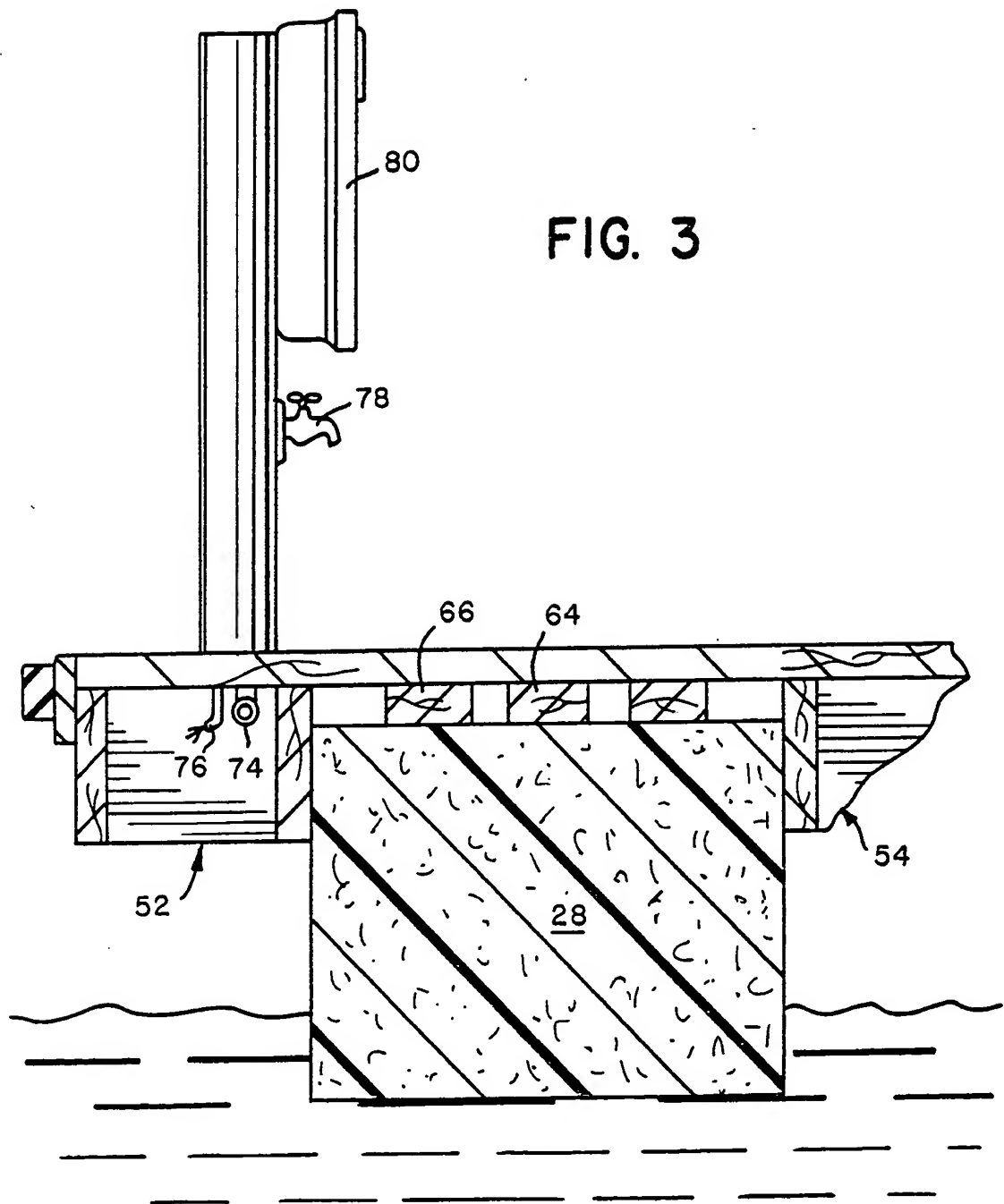


FIG. 2C

FIG. 3



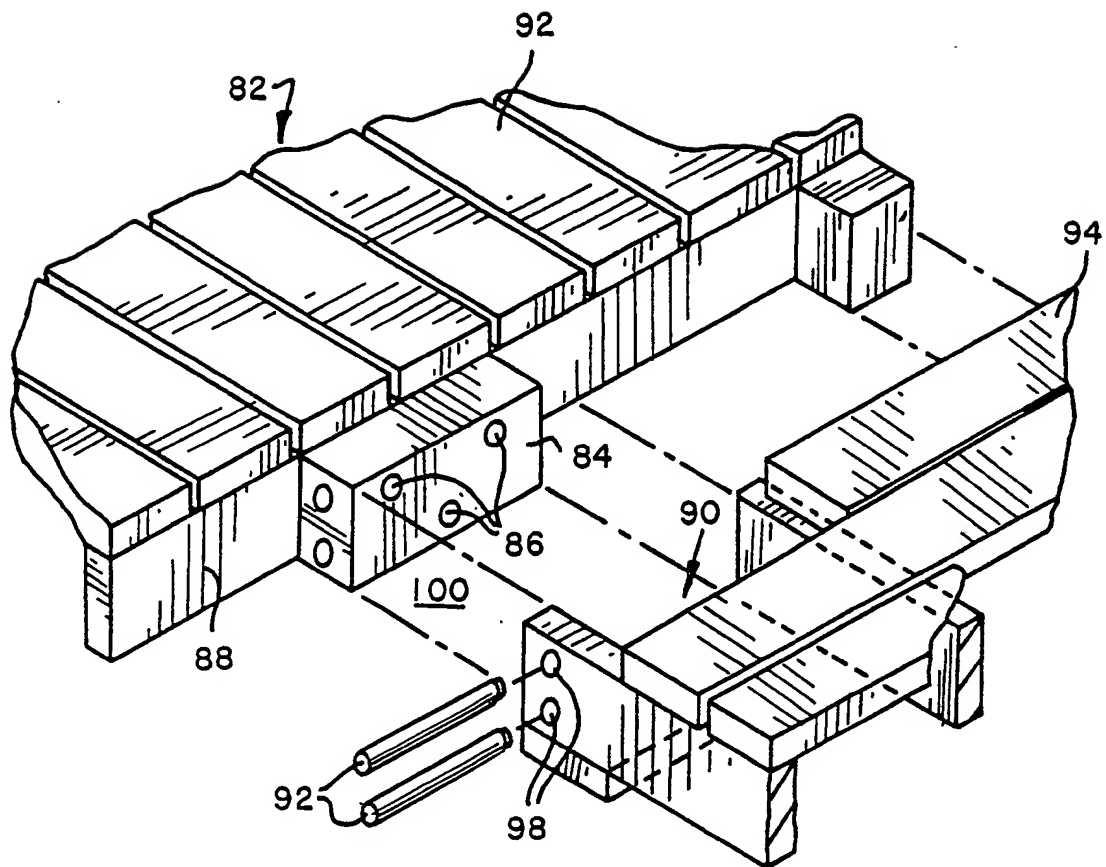


FIG. 4

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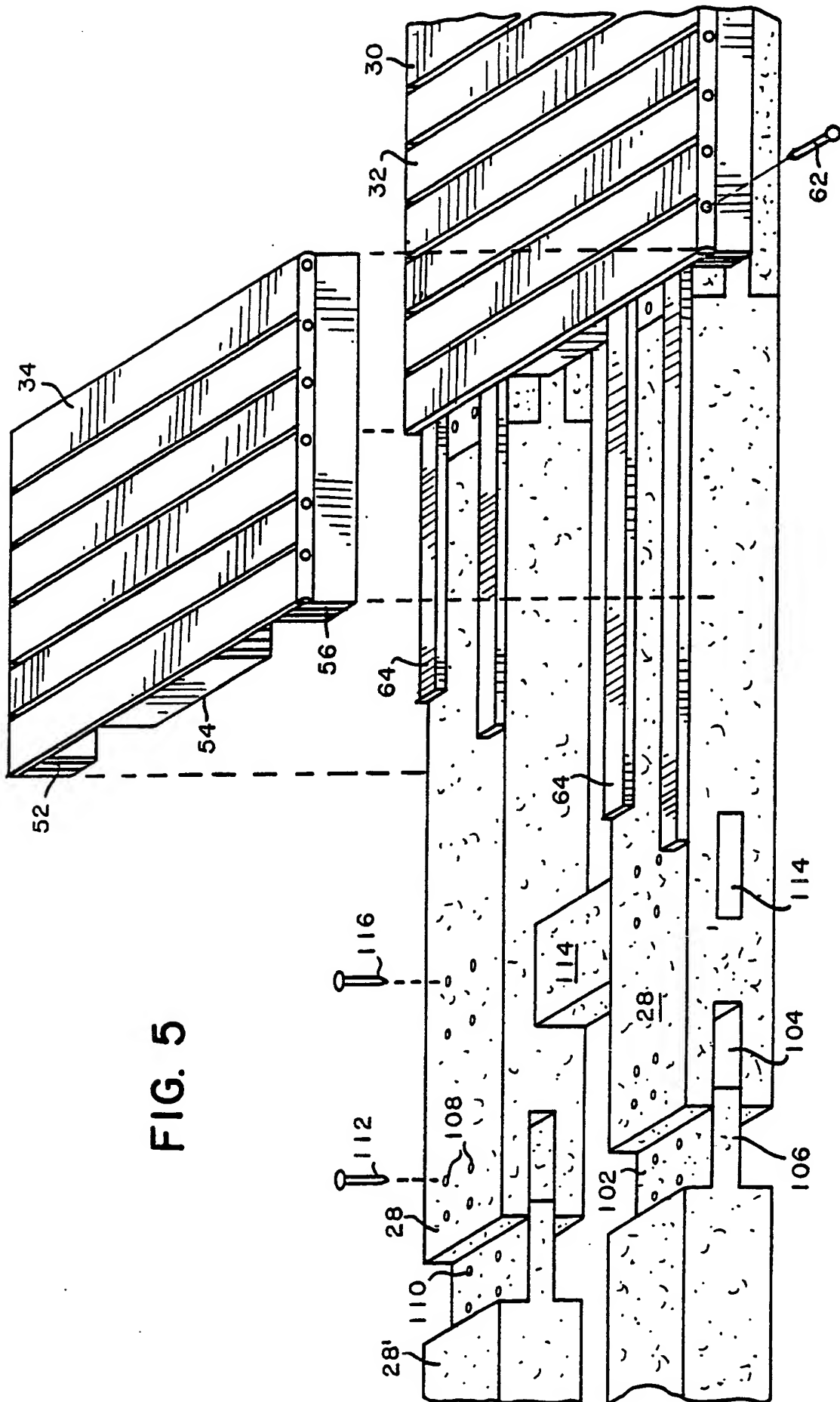


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 87/01979

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³ According to International Patent Classification (IPC) or to both National Classification and IPC IPC: B63B 35/38 U.S. Class: 114/263; 405/219																				
II. FIELDS SEARCHED <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched ⁴</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="vertical-align: top; padding: 5px;">U.S. C1.</td> <td style="vertical-align: top; padding: 5px;">14/27 114/263, 266, 267 405/219, 221</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵</div>			Classification System	Classification Symbols	U.S. C1.	14/27 114/263, 266, 267 405/219, 221														
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category ⁶</th> <th style="border-bottom: 1px solid black;">Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷</th> <th style="border-bottom: 1px solid black;">Relevant to Claim No. ¹⁸</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;"><u>X</u></td> <td style="vertical-align: top; padding: 5px;">US, A, 3,779,192. (Gonzalez)</td> <td style="vertical-align: top; padding: 5px;">1-5,8,11,14</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">18 December 1983.</td> <td style="vertical-align: top; padding: 5px;">6,7,9,10,12,13, 15</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">US, A, 3,616,774 (Thompson) 02 November 1971.</td> <td style="vertical-align: top; padding: 5px;">6,12</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">US, A, 3,448,709 (Hardwick, Jr.) 10 June 1969</td> <td style="vertical-align: top; padding: 5px;">7,10,13</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="vertical-align: top; padding: 5px;">GB, A, 800,370 (Pound et al) 27 August 1958.</td> <td style="vertical-align: top; padding: 5px;">9,15</td> </tr> </tbody> </table>			Category ⁶	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸	<u>X</u>	US, A, 3,779,192. (Gonzalez)	1-5,8,11,14	Y	18 December 1983.	6,7,9,10,12,13, 15	Y	US, A, 3,616,774 (Thompson) 02 November 1971.	6,12	Y	US, A, 3,448,709 (Hardwick, Jr.) 10 June 1969	7,10,13	Y	GB, A, 800,370 (Pound et al) 27 August 1958.	9,15
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<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>¹⁵ * Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>																				
IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">Date of the Actual Completion of the International Search ²</td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">Date of Mailing of this International Search Report ³</td> </tr> <tr> <td style="padding: 5px;">22 September 1987</td> <td style="text-align: center; padding: 5px;">04 NOV 1987</td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">International Searching Authority ¹</td> <td style="border-bottom: 1px solid black; padding: 5px;">Signature of Authorized Officer ¹⁰</td> </tr> <tr> <td style="padding: 5px;">ISA/US</td> <td style="padding: 5px;"> Sherman D. Basinger </td> </tr> </table>			Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ³	22 September 1987	04 NOV 1987	International Searching Authority ¹	Signature of Authorized Officer ¹⁰	ISA/US	Sherman D. Basinger										
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